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SOCIAL SCIENCE ASSOCIATION

OF

PHILADELPHIA.

PAPERS OF 1874.

STATISTICS RELATING TO THE BIRTHS, DEATHS,
MARRIAGES, AND MOVEMENT OF POPULATION
IN THE CITY OF PHILADELPHIA, FROM
JANUARY 1, 1861, TO JANUARY 1, 1872.

BY JOHN STOCKTON-HOUGH, M. D.

[RE-PRINTED FROM THE PENN MONTHLY FOR SEPTEMBER, 1873.]

PAPERS READ BEFORE THE ASSOCIATION.

The following is a list of the Papers read before the Association :

1871. *Compulsory Education.* By Lorin Blodget.
Arbitration as a Remedy for Strikes. By Eckley B. Coxe.
The Revised Statutes of Pennsylvania. By R. C. McMurtrie.
Local Taxation. By Thomas Cochran.
Infant Mortality. By Dr. J. S. Parry.
1872. *Statute Law and Common Law,* and the Proposed Revision in Pennsylvania. By E. Spencer Miller.
Apprenticeship. By James S. Whitney.
The Proposed Amendments to the Constitution of Pennsylvania. By Francis Jordan.
Vaccination. By Dr. J. S. Parry.
The Census. By Lorin Blodget.
1873. *The Tax System of Pennsylvania.* By Cyrus Elder.
The Work of the Constitutional Convention. By A. Sydney Biddle.
What Shall Philadelphia do with its Paupers? By Dr. Ray.
Proportional Representation. By S. Dana Horton.
1874. *Statistics Relating to the Births, Deaths, Marriages, etc., in Philadelphia.*
By John Stockton-Hough, M. D.



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STATISTICS.

RELATING TO THE BIRTHS, DEATHS, MARRIAGES, AND MOVEMENT OF
POPULATION IN THE CITY OF PHILADELPHIA, FROM
JANUARY 1ST, 1861, TO JANUARY 1ST, 1872.

THE writer, in the course of his studies, found it desirable to tabulate some of the facts concerning the birth-rate in Philadelphia, and finding several tables¹ had accumulated in the course of his researches, has thought that extracts from these might possibly be of value to those interested in the subject, and he was, for this reason, induced to offer them for publication.

It is proper to state here, that the space allowed for this article precludes the introduction of many useful deductions and comparisons.

The movement of the population in one country, as compared with that of another, as well as that of the same place compared with preceding enumerations, always a matter of interest, becomes more and more so as civilization advances, bringing with it evidences of physical and moral degeneracy, as evinced in the proportionally fewer marriages, in a smaller number of births to each marriage, a lessened birth-rate, a declining proportion of male births, increase in the proportion of male deaths, increasing proportion of females in the general population, increasing illegitimacy, increase in the proportion of inhabitants in cities over the country, and in some instances a slowly diminishing mortality; and, notwithstanding this last occasional occurrence, *always* a *declining* increase in population, which means that increase must cease in some dimly distant future.

It is no part of the purpose of the present article to prove these deductions, but merely to illustrate them by the movement of population in Philadelphia, the results agreeing in the main with those arrived at by most statisticians, particularly where the latter are *Physicians*. The acknowledged labors of Dr. J. M. Toner, of Washington, D. C., and Dr. Nathan Allen, of Lowell, Mass., corroborate the views taken in this article.

Philadelphia, with an area of $129\frac{1}{8}$ square miles (a length of

¹ The entire MS., including these tables and other detailed calculations omitted in this article, have been placed in the Library of the Historical Society of Pennsylvania, for reference, by any person who may hereafter undertake the compilation of statistics relating to this city.

23 miles, average width of $5\frac{1}{2}$ miles), or 82,700 acres, had a population, in 1870, of 674,022 souls, or 5,225 inhabitants to the square mile.¹

There were, in 1870, 127,746 families, having an average of 5.28 persons to each family. There were 112,366 dwellings, and 6.01 persons to each.² There were 490,398 native, and 183,624 foreign persons in the population. Of these, 651,854 were white, and 22,147 colored.

The population is very unequally distributed, as there are several farms, gardens, and parks (about 2,500 acres,) within the city limits, besides several small towns and villages. About 27.7 per cent. of its population are of foreign birth, from which, it is probable, that a proportionally larger part of the births are recruited, as one-half of the parents giving birth in Massachusetts (with a population 22.9 per cent. foreign) in 1860, were of foreign birth; and in New York city, the Registrar says that in 1870, "as usual, the children of foreign parentage greatly predominated" (9,282 parents foreign, 2,553 native). Hence, New York city, which had a population composed of persons of foreign birth, to the extent of 44.5 per cent., recruited 78.4 per cent. of its births from this same foreign element—or, in other words, more than three-fourths of the births were recruited from much less than half of the entire population: stating it differently, the native population recruit one birth from every 204.9 of their own number, while the foreign population recruit one from every 45.1, and are consequently more than four and a half times as prolific. In Massachusetts, as before stated, one-half of the births are recruited from less than one-fourth of the population (foreign), or foreigners are more than three times as prolific as the natives. With these facts before us, we are impressed with the belief that Philadelphia, with a population of 27.7 per cent. foreign, must recruit more than three and a half times as many births, propor-

¹ Chicago, with an area of	223	square miles, has	1,350	inhabitants to each.
London,	"	" 122	"	" 26,000
Boston,	"	" 110	"	" 2,300
San Francisco,	"	" 90	"	" 1,500
Paris,	"	" 63	"	" 28,000
Pekin,	"	" 56	"	" 28,500
N. Y. City,	"	" 22	"	" 43,000

N. Y. Medical Record, May 15, 1873, p. 240.

²New York (1870) had 64,044 dwellings, with 14.72 persons to each, and 185,789 families, with 5.07 persons to each.

tionally, from its inhabitants of foreign birth as from the natives. It is greatly to be regretted that the nativity of parents¹ of children born in Philadelphia, as well as their ages and the number of the pregnancy, should not be recorded.

Births by years—boys to 100 girls²:

	1861	1862 ³	1863	1864	1865	1866	1867	1868	1869	1870	1871	Mean Average. 11 years.
Boys to } 100 girls. }	109.3	107	110.9	112	113.4	111.7	109.8	108.6	109.8	113.2	110.9	110.54
Inhab. to 1 marriage an'y. }	128	123	107	88	81	87	102	99	100	101	96	101
Births to each marriage. }	3.91	3.16	2.79	2.30	2.24	2.40	2.62	2.70	2.64	2.67	2.69	2.71
Average number of boys to 100 girl· for 11 years, 1860-72 (white).....	(colored).....											110.65
" " " " " " " " still-born ⁴ "												101.14
Percentage of still-births to entire births												134.40
*Percentage of still-births in almshouse, 6 years.....												4.59
Number of boys to 100 girls still-born in almshouse, 6 years.....												7.71
Of 729 illegitimate births in almshouse (1864-1869) there were boys to 100 girls.....												113
Of 459 so-called legitimate in same institution for same period, boys to 100 girls.....												85.9
Percentage of total births in almshouse declared illegitimate by their mothers.....												93.6
In white population, 1810, there were 100 females to												98 males.
" " " " 1830 " " 100 " " 92 males }												91.59 "
" colored " " 1830 " " 100 " " 75.70 " }												90.935 "
" white " " 1860 " " 100 " " 91.18 " }												90.54 "
" colored " " 1860 " " 100 " " 70.54 " }												90.50 "
" white " " 1870 " " 100 " " " }												
" colored " " 1870 " " 100 " " " }												
Average males to 100 females dying 1860-1872 (still-births deducted).....												112.29
" " " " " " " " (still-births not deducted).....												113.44
Number of males in the population 1860, to each male dying, 1860-1872.....												33.5
" females " " " " " " " " female " "												39.4

Annual average for 11 years (1860-1872):

	White.		Colored. ⁶		Still-born.		Illegitimate.		Twins. ⁷	Triplets. ⁸
Tot'l Births	Males.	Females.	Males.	Females.	Males.	Females.	(Estimated.)	(Pairs)	(Cases.)	
16,338	8,582	7,756	128.4	127	437	325	680	153	2.2	

Yearly difference between births and deaths⁹:

(Plus sign indicates excess of births; minus sign excess of deaths.)										
1861	1862	1863	1864	1865	1866	1867	1868	1869	1870	1871
+2803	+852	+1220	+526	-143	+1277	+3560	+3124	+2689	+1055	+1986
										Average.
										+1723

¹See reference to the author's paper on "Effect of Nationality of Parents on Fecundity and Proportion of Sexes in Births."

²Boys to 100 girls born in N. Y. city, 1853 to 1870, 107.8.

³Rebellion began in spring of 1861; many soldiers discharged in 1863-4, and all in 1865.

⁴From 1670-1675, in Paris there were 5 births to each marriage; from 1764-1775, 1 marriage to 4 births; from 1864 to 1869, 1 marriage to 3 births.—*Chevallier et Lagneau—Ann. d'Hyg. Pub., July, 1873, p. 57.*

⁵In New York City, 1860, among whites, 95.23 males to 100 females; among colored, 76.13 to 100.

⁶Census of United States for 1870, compiled by General Walker, gives total deaths of colored males, 34,241; females, 32,942, or 103.9 males to 100 females; white males, 225,818; females, 198,322, or 113.8 males to 100 females. The deaths of white males under 1 year amounted to 52,402; females, 42,152, or 121 males to 100 females; white males under 5 years, 93,928; females, 79,776, or 117 males to 100 females. The proportion of male deaths among the colored population is greater than among the white, though the above figures would

6 *Statistics Relating to the Births, Death-Rate, etc.*

Conceptions by months and seasons—boys to 100 girls, 1861—1872 :

	<i>Spring.</i>			<i>Summer.</i>			<i>Autumn.</i>			<i>Winter.</i>		
	Mar.	Apr.	May.	June	July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
	107.2	114.8	113.9	106.4	109.4	110.8	110.3	107.5	109.2	107.3	110.6	112.4
	112.			108.9			109.			110.7		
Average No. } Conceptions. }	1063			987			1029			1070		
Average No. } Marriages. }	1454			1395			1687			1591		

Months in order of decrease of male conceptions—boys to 100 girls :

Apr.	Feb.	May	Aug.	Jan.	Sept.	July	Nov.	Oct.	Dec.	Mar.	10 Jun.
114.8	114.2	113.9	110.8	110.6	110.3	109.4	109.2	107.5	107.3	107.2	106.4

Months in order of decrease of conception, both sexes, (all brought to 31 days): February, April, November, January, June, March,¹⁰ December, October, May, September, July and August.

Months in order of decrease of marriages (all brought to 31, days): October, December, November, September, January, April, June, May, February, July, August, March.

Conceptions compared with marriages by quarters :

	1st Qr.	2nd Qr.	3d Qr.	4th Qr.
Percentage of Conceptions.....	26.27	25.66	22.95	25.75
“ marriages.....	23.84	24.23	23.85	27.96
Boys to 100 girls ¹¹	110.67	111.70	110.17	108.00

indicate the opposite, owing to the much smaller proportion of males in the colored population. This greater mortality was forcibly shown in a recent article by the writer—“On the Relative Viability of the Sexes,” etc.—*New York Med. Record*, June 16 and July 15, 1873, pp. 297–302, 353–4–5.

Mr. Tulloch says that “the mortality of the slave population of the West Indies is very much greater in the male sex than in the female, the proportion in adults being nearly double among males.” M. Rickman found the average mortality for 5 years preceding 1830 to be 1 in 51, while in the negro population it had been 1 in 36.—*British and Foreign Med-Chir. Review*, Vol. iv., p. 262.

Total Labors.

7 Twin labors in entire city (1860–1872), 1,740, or 1 in 105 labors.....	182,627
“ “ almshouse (1864–1869), 14, or 1 in 85 “	1,200
8 Triplet cases in entire city (1860–1872), 25, or 1 in 7,269 labors.....	182,627

⁹In 1872 the births amounted to 20,072; deaths, 20,544. Excess of deaths over births, 472.

¹⁰Lessened proportion of boys probably due to devotions and fasts of the Lenten season. In Paris, 1670 to 1787, number of conceptions in Feb., 907; March, 857; April, 1,000.—*Villermé*.

Spring conceptions in England, 7 per cent. over that of any other quarter.

¹¹New York city, (1870), boys to 100 girls, 1st quarter, 99.01; 2d quarter, 114.7; 3d quarter, 110.41; 4th quarter, 110.6.

Decade of 1821-1830, compared with the foregoing of 1861-1872. Conceptions by months and seasons—boys to 100 girls, 1821 to 1830 :

<i>Spring.</i>			<i>Summer.</i>			<i>Autumn.</i>			<i>Winter.</i>		
March,	April,	May.	June,	July,	August.	Sept.,	Oct.,	Nov.	Dec.,	Jan.,	Feb.
103.7	111.5	107	107.2	109.8	109.1	108.1	112.5	106	109.1	111.9	109.5
107.33			108.7			108.87			110.16		

Months in order of decrease of male conceptions (1821-1830): October, January, April, July, February, December, August, September, June, May, November, March.

Months in order of decline in conceptions—both sexes (1821-1830): May, December, March, April, February, June, January, November, October, September, July, August.

NOTE.—Effect of month of conception and birth on the expectation of life, exhibiting the percentage of deaths which occur within the first year after death :
 Month of conception...Mar. April, May, June, July, Aug., Sept., Oct., Nov., Dec., Jan., Feb.
 Percentage.....7.8 7.7 7.0 8.1 8.6 9.5 10.8 9.6 8.5 7.2 7.5 7.7
 Month of Birth.....Dec. Jan., Feb'y, Mar., Apr., May, June, July, Aug., Sept., Oct., Nov.

—Taken from Dr. E. Smith's book on Cyclical Changes. The cases, 3,050 in number, were taken from the "Register of the Counties of Durham, Northumberland, Westmoreland, and Cumberland (England). Population about 1,000,000, and scarcely any manufacturing towns." He ascribes the greater mortality of those born in months of May, June and July to the time of birth rather than to the time of conception.

Comparison of the birth-rate and movement of population in the poorest and richest wards (1861-1872):

	<i>Poorest.</i>	<i>Richest.</i>	
	1st Ward.	5th Ward.	8th Ward.
Population in 1870.....	25,817	18,736	22,286
Males to 100 females in population.....	101.09	98.18	71.84
Average percentage of births to population...	3.41	1.61	1.46
Average No. inhab. to each marriage annually	—	—	—
Average No. inhab. to each birth annually....	27.28	61.28	68.65
Average No. inhab. to 1 death annually (4 yrs.) ¹	36.50	42.00	57.00
Average No. boys to 100 girls born (1870)...	117.71 ²	—	—
Average No. inhabitants to each house.....	5.04	7.97	7.04
Average number persons to each family.....	4.86	5.51	6.23
Percentage of children born alive, dying under 5 years of age.....	—	—	—

¹M. Villot, prior to 1830, in Paris, found the deaths 1 in every 42 inhabitants in richest arrondissements, and 1 in 25 in poorest.

² Of 100 infants born alive to the gentry of England (1844), there died 20; to the working-classes, 50. In the aristocratic families of Germany there died, in four years, 5.7 per cent.; amongst the poor of Berlin, 34.5. In Brussels the mortality, up to the fifth year, was 6 per cent. in the families of capitalists, 33,

Months (all of 31 days) in order of decrease of conceptions, compared by wards:

Poorest, 1st Ward—	Feb.	Dec.	Jan.	Apr.	June	Nov.	Mar.	Oct.	Sep.	July	May	Aug.
Rich- { 5th “	—Apr.	Dec.	Feb.	June	Oct.	Jan.	Nov.	Sept.	July	May	Mar.	Aug.
est. { 8th “	—Apr.	Dec.	Feb.	Jan.	June	July	Nov.	Oct.	Mar.	Sep.	Aug.	May
Entire City,	—Feb.	Apr.	Nov.	Jan.	June	Mar.	Dec.	Oct.	May	Sep.	July	Aug.

The comparison of the birth-rate, death-rate, and proportion of sexes born in the richest and poorest parts of a city, I have never met with in any of my researches, except the instances referred to in the foot note; and bring these facts together for the city of Philadelphia, for the first time. The wards chosen are the 1st, 5th and 8th. The first ward is located in the extreme southern part of the city, and is marshy and wet on its southern border; its inhabitants being of the poorer, lower and middling classes. The 5th and 8th wards, located in the central part of the city, represent the most wealth, culture and refinement, the “oldest families,” the 5th being a part of the oldest portion of the city, while most of the 8th is comparatively recent. In both of these last-named wards there is a mixture of all classes and colors, but the wealthy predominate; if they were occupied exclusively by the rich the statistical differences would be still greater. The relative density of population in these districts is not within my reach, but the 1st ward is much less closely built up than either of the others, the 5th having no vacant lots, the 8th very few.

The most extraordinary feature in these comparisons is the per cent. amongst tradesmen and professional people, and 54 per cent. amongst the workingmen and domestics.” De Villiers states that “the mortality amongst the workingmen of Lyons is 35 per cent., and in well-to-do families and agricultural districts it is 10 per cent.” Dr. Jacobi found the mortality to be 59 per cent. at the Randall’s Island Foundling Hospital, and Dr. John S. Parry calculates the mortality of the children in the Philadelphia Hospital at 62.12 per cent.—*Dr. John S. Parry. Infant Mortality, etc. Penn Monthly, June, 1871. P. 21-2 (out of Jacobi, of N. Y.).*

²The sexes are not given by wards; but I have taken the trouble to calculate it for 1 year, and find it was far above the average for the first ward, but the data in the other wards are not sufficiently complete to allow of any reliable calculations. It is interesting to know, however, that the proportion of boys was as high as 115.39 to the 100 girls in the report of a practitioner having cases principally among the lower and middle classes, while it was only 69.00 males to 100 females in the records of an accoucher whose practice was exclusively among the wealthiest class, a difference of 23.19 per cent. in the excess of males in favor of the former.

much higher rate of mortality, coupled with an apparent fecundity nearly three times as great, in the poorest ward as compared with the richest—and I have no doubt, if the facts could be reached, we should find the proportion of boys to girls quite 50 per cent. higher among the poorer class than among the wealthy.

In the comparison of the total number of conceptions by months in these wards, it is noticeable that the *geniale tempus* (April) seems to have had more effect on the wives of the wealthy than on those of the poorer class—and the lenten fasts appear to have been more generally observed among the rich than among the poor—if we may judge by the greater decline in conceptions among the former than among the latter in the month of March.

Table showing the percentage of men and women married at different ages, in Philadelphia, from 1861 to 1872.

Ages.	Under 20	20 to 25	25 to 30	30 to 40	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	Total mar- riages all ages.
Per centage of men.	.466	34.83	31.04	19.34	5.88	2.04	.538	.077	.044	
Per centage of women.	18.547	43.47	18.08	10.45	3.433					62,904
Average births to each marriage (annually)										
“ “ “ “ “ “	first ½ decade.....					2.83				
“ “ “ “ “ “	last ½ “					2.64				
“ “ “ “ “ “	1861 to 1872.....					2.71				
Decrease per cent. in last half of decade..... 6.71										

NOTE.—According to Dr. Emerson, “Villot’s researches seem to show that the proportion of mortality is regulated less by the density of the population than by the opposite circumstances of ease and poverty.” The Registrar General of England (1841) says: “It has frequently been observed that marriages and births are most numerous where mortality is the highest; and this doctrine is borne out by the facts in a table where the mortality is raised 44 per cent. (Lancashire and Cheshire); the marriages and births were raised 21 per cent.”

Villermé suggests that the sterility of marriages in Paris, where there is no appreciable physical cause, is principally owing to the will of the inhabitants, and assures us that it is principally the rich quarters in which the fecundity is most restrained.—*Annales des Sci. Nat.* V, VIII., p. 426. The fact of a much smaller proportion of male births in rich as compared with poor quarters, points to actual physical decline in fecundity, and suggests a fallacy in the theory of this excellent French statistician.

10 *Statistics Relating to the Births, Death-Rate, etc.*

Average inhabitants to each marriage (annually) ¹ first $\frac{1}{2}$ decade.....	103.7
“ “ “ “ “ “ “ last $\frac{1}{2}$ “	98.4
“ “ “ “ “ “ “ 1861 to 1872.....	101.0
Decrease per cent. in the number of inhabitants to each marriage.....	5.1

Average number of boys born to 100 girls, first 6 years (white), 1861-7..	110.71
Average number of boys born to 100 girls, last 5 years, (white).....	110.46
“ “ “ “ “ “ “ 11 “ 1861 to 1872....	110.65
Decrease per cent. in the proportion of boys in the last 5 years.....	.22

Average number of boys born to 100 girls, first $\frac{1}{2}$ decade, 1820-1831.....	108.86
“ “ “ “ “ “ “ last $\frac{1}{2}$ “ “ “	107.36
“ “ “ “ “ “ “ whole “	108.11
Decrease per cent. in proportion of boys in the last half decade	1.38.

Table exhibiting the number, proportion and percentage of sexes in the population, births and deaths, from some hereditary diseases² and accidental causes, etc., occurring in the city of Philadelphia, from Jan. 1st, 1861, to Dec. 31st, 1871:

	Total No.	Percentage of whole No. dying.	Males to 100 Females.
Population of Philadelphia, 1870.....	674,022		89.50
Births for the 11 years 1861-72.....	182,627		110.65
Deaths “ “ “ “ all ages.....	174,000		113.44
“ “ “ “ “ still-births excluded	165,604		112.29
“ “ “ “ “ still-born.....	8,396	4.8	133.50
“ Of children under 20 years of age, from all causes.....	93,775	53.9	113.61
“ Adults (all above 20 years) from all causes.	76,142	43.7	103.20
“ From old age (from 60 to 110).....	4,362	2.5	53.42
“ “ Murder and violence, all ages.....	175	.1	446.20
“ “ Suicide.....	339	.19	438.09
“ “ Intemperance.....	405	.23	136.84
“ “ Wounds	36	.02	1700.00
“ “ Apoplexy.....	2,093	1.20	123.25
“ “ Gout.....	50	.028	284.61
“ “ Diseases, inflammation, and congestion of the heart, all ages.....	4,644	2.66	102.35
“ “ Diseases, inflammation, and congestion of the heart, under 20 years..	903	.51	136.36
“ “ Diseases, inflammation, and congestion of the heart, above 20 years..	3,741	2.15	95.55
“ “ Diseases, inflammation, and congestion of the brain, all ages.....	9,065	5.21	132.13
“ “ Diseases, inflammation, and congestion of the brain, under 20 years..	6,320	3.63	118.45

¹New York city, 1869, 1 to 108 inhabitants; 1870, 1 to 118 inhabitants.

²See further in author's paper "On the Laws of Transmission of Resemblance from Parents to their Children,"—*New York Medical Record*, Aug. 15, Sept. 15, and Oct. 15, 1873.

	Total No.	Percentage of whole No. dying.	Males to 100 Females.
" " Diseases, inflammation, and congestion of the brain, above 20 years..	2,745	1.58	324.50
" " Scrofula, all ages.....	736	.42	120.36
" " " under 20 years.....	581	.33	122.59
" " " above " ".....	155	.09	112.33
" " Pulmonary consumption, all ages ¹ ...	22,242	12.78	99.15
" " " " under 20 years...	3,087	1.78	77.31
" " " " above " ".....	19,155	11.00	103.30
" " Paralysis, all ages.....	2,207	1.26	122.92
" " Cancer ² , all ages.....	2,339	1.34	43.05
" " Diseases peculiar to women, all ages	1,202	.69	
" " Whooping cough	1,182		73.11
" " Scarlet fever, (42 years ending 1871)	15,059		96.7
" " Measles, " " " " " " " "	2,744		105.7

Age and percentage of decedents from consumption of the lungs, in Philadelphia, for the eleven years from January 1st, 1861, to December 31st, 1872 :

Average age of all decedents from consumption.... 35.57 years.
Average age of all decedents dying after the 20th year..... 39.41 "

¹The following are the percentages of deaths from pulmonary consumption of total mortality for the years following : 1860-1871—13.13—13.54—12.99—12.37—12.31—14.80—14.80—14.30—14.11—14.49—13.84—11.82. The percentage of deaths from this cause seems to be gradually increasing, until the two last years, when there is an apparent decline ; but this is not real, as the total mortality was greatly increased in these years from Small-Pox and infantile diseases, hence the difference.—*Mr Chambers' Report*, 1872, p. 38.

²In the author's paper on "Deaths from Cancer, occurring in Philadelphia, from Jan., 1861, to Dec. 30th, 1870, showing the relative proportion of males and females dying of this disease, and the percentage of women dying of cancer of the uterus" (*Journal of the Gynecological Society* Boston, Sept., 1872. pages 201-2-3-4; extracted in *N. Y. Medical Record*, Feb. 1st, 1873) he has shown that 232 per cent. more women than men die of cancer, and that of all the women dying of cancer, 28.66 per cent. die of cancer of the uterus, or 20.44 per cent. of the whole number of deaths from this disease without regard to sex ; of those, 39.2 per cent. die before the 45th year, and 60.8 per cent. after. Of all the women dying of cancer, without regard to sex, 65.7 per cent. die after 45 years of age.

In Providence, R. I., 15 years ending 1871, 37 males to 100 females died of cancer. In England, 1856, 4,069 females and 1,690 males, or 45.5 males to 100 females died of this disease.

12 *Statistics Relating to the Births, Death-Rate, etc.*

Average age of all decedents from consumption dying after 30th yr., 46.77 years.
 " " " " " 40th yr., 51.73 "
 " " " " " 50th yr., 58.51 "

The percentage dying at different ages was as follows:

Under 1 year.	1 to 2.	2 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 30.
1.73	1.06	1.34	.99	1.29	6.90	30.39
30 to 40.	40 to 50.	50 to 60.	60 to 70.	70 to 80.	80 to 90.	90 to 100.
24.21	16.94	8.95	5.28	2.19	.34	.019

Statistics showing movement of population in Philadelphia:

Year	Population ¹	Births,	Inhabitants to 1 Birth Annually	Deaths	Inhab. to 1 Death Annually	Marriages,	Births to each Marriage Annually ² ...	Inhabitants to 1 Marriage Annually
1861	565,529	17,271	32.7	14,468	38.9	4,417	3.91	128
1870	674,022	17,194	39.2	16,139	41.7 ³	6,421	2.67	105
Average, 1861-72..	16,602	37.3	14,870	39.1	6,120	2.71	101	
" 1820-31..	6,467	22.6 ⁴		41.1 ⁵				
" 1806-20..				47.86				
Total births, 10 years, 1860-1871.....								164,281
" deaths, 10 years, " "								147,435
Gain in population by excess of births over deaths ⁶								16,846
Total decennial increase, 19.2 per cent., or.....								108,493
Population recruited from other places during the decade.....								91,647
Average yearly influx becoming permanent inhabitants.....								9,164
" monthly " " " "								764
" daily " " " "								24.5
" " gain by excess of births over deaths, about.....								4.6
" " increase in the population, about.....								29
Average yearly increase by excess of births over deaths.....								1,684
" " " recruited from abroad.....								9,164
" " " from all sources.....								10,848

¹At a regular increase of 11,000 per annum, the population of Philadelphia will be in the June of the following years: 1873, 707,022; 1874, 718,022; 1875, 729,022; 1876, 740,022; 1880, 784,022, and it would not reach a million at this rate until about the year 1900. Circumstances connected with the rebellion, no doubt, checked the increase of population to a slight extent, yet this has probably been in a measure compensated by greater activity and increase since 1864. At furthest, we will not have above 750,000, or say 775,000, in 1876. Statisticians, who are not physicians, always estimate increase in the population far above what is ever realized. For example, a number of persons

Number of deaths by ages and sexes, compared for the decade from 1820 to 1831, with decade 1860 to 1871 (still-births deducted):

Deaths—Annual average.	Under One Year.	1 to 2	2 to 5	5 to 10	10 to 15	15 to 20	20 to 30	30 to 40	
1861 to 1872,	3500	1347	1387	703	296	484	1662	1443	
1820 to 1830,	855	325	267	146	71	114	456	457	
Multiply all last by 4 to bring the total no. deaths the same.	3420	1400	1068	584	284	456	1824	1828	
Deaths—Annual average.	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 to 100	100 to 110	110 to 120	Males to 100 Females.
1861 to 1872,	1191	945	896	736	363	78	10.2	.63	112.29
1820 to 1830,	375	246	193	135	74	21	3.2	.5	
Multiply all last by 4 to bring the total no. deaths the same.	1500	1056	772	540	296	84	12.8	2	
									Total all ages—still born excluded.
									15,061
									3,761
									15,061

have calculated a population of more than 100,000,000 for the United States in 1900, and this even so late as 1869! And Gen. Walker is only a little nearer the truth when he sets it at 76,000,000, which is double what it was in 1870. Can the population double in 30 years? Have we any such experience?

²Deduct 4.1 per cent. for illegitimate births, and we have 2.6 legitimate births to each marriage. Estimated annual average illegitimate births, 680, 188 of which occur in the almshouse. The above estimate of 4.1 per cent. is taken from Dr. John S. Parry's excellent paper on Infant Mortality in the Proceedings of Philadelphia Social Science Association, 1871; also in pamphlet, p. 8.

³New York city (1870) had one death to every 33.9 inhabitants. We are scarcely warranted in making any comparisons between New York and Philadelphia, for the reason that there is a larger proportion of the poorer classes in New York than in Philadelphia, for the reason that many of the well-to-do merchants and trades-people live in New Jersey, Brooklyn and other neighboring places not within the city limits, while our suburban residences are principally comprehended in the city limits.

The yearly deaths in San Francisco are 17 to 1,000 inhabitants; St. Louis, 20; Cincinnati, 20; Baltimore, 25; *Philadelphia*, 26; Chicago 27; Brooklyn, 28; Boston, 30; New Orleans, 30; Newark, 31; New York, 32; Savannah 36; Montreal, 37; Memphis, 46; Valparaiso (Chili), 66. Abroad—Zurich, 13; Geneva, 19; Basle, 20; London, 21; Paris, 21; Liverpool, 27; Leeds, 27; Glasgow, 28; Dublin, 29; Leghorn, 30; Venice, 30; Milan, 30; Vienna, 31; Stockholm, 31; Nice, 31; Havre, 31; Rotterdam, 31; Berlin, 32; Bologna, 32; Naples, 35; Florence, 35; Rome, 36; Prague, 41; Munich, 41; Cadiz, 44.

⁴Emerson's Med. Statist. of Phila., Amer. Jour. Med. Sci., 1831, p. 40.

⁵Whites (38.3 to 49.1), av., 42.3; blacks (16.9 to 27.2), av., 21.7. Blacks in year 1827—males, 1 in 14; females, 1 in 22, or with an excess of 32 per cent. of females in population, had an excess of 13 per cent. of male deaths, exclusive of still-born. Total population, U. S. 1860, 1 death to 79.77 inhabitants; 1870, 1 in 78.32.

⁶The births reported in New York city have never exceeded the deaths as recorded.—*Report of Board of Health*, 1870, p. 293.

Ratio of deaths (colored) to entire mortality for 62 years.....	8.7 per cent.
" " " " " " " " 1863 to 1867.....	67 "
Average mortality 62 years (white).....	I in 47.836 inhab.
" " " " (colored).....	I in 27.766 "
" " " " 1858 to 1862, inclusive, (colored).....	I in 34.780 "
Ratio of still-births to total births.....	4.3 per cent.
" " " " " " " " deaths.....	5.8 "
" " living births to population.....	2.8 "
" " deaths to births.....	74.5 "
Natural annual increase.....	5.7 "
Average " "	3.3 "
" " immigration.....	2.6 "
Mean age at death.....	23.57 years.
" " of living.....	24.29 "

	Friends.	Philada.	Advantage.
Maximum vitality	310.56	257.74	20.49 pr. ct.
Average proportionate mortality from 20 to 60 years of age.....	14.25	17.58	23.37 "
Expectation of life.....	43.73	35.09	24.62 "
Probable life.....	48.08	33.44	43.78 "
Proportionate mortality at birth.....	124.66	180.38	44.70 "
Comparative mean expectation of life, Price's London.....			23.70 years.
" " " " Philadelphia.....			31.46 "
" " " " " Farr's English No. 3, male			31.77 "
" " " " " " " female			32.33 "
" " " " " Carlisle.....			32.66 "
" " " " " Friends'.....			33.11 "

¹Proceedings of the American Philosophical Society, Phila., 1870, vol. xi., pp. 17-22.

²The "Orthodox" Friends in Philadelphia number, according to Dr. Edward Maris, about 2,000. Of the "Hicksite" branch, I have no reliable data; but they probably number about 5,000. There are probably from 15,000 to 20,000 persons living in Philadelphia at the present time who derive their origin from members of the Society of Friends.

In Geneva, where a greater longevity (average age at death) prevails than any other place in Europe, the births only slightly exceed the deaths.

Before commenting on the results of these computations it is proper to observe that a large number of births are not recorded, this deficit being estimated from one to two thousand annually, or more properly, about 12 or 15 per cent.

In examining the proportion of boys to girls born during the decade stated, it is noticeable that this proportion was lowest in 1862, when many men between the ages of 18 and 45 years were in the army, leaving wives temporarily without husbands, of the ages and classes from which above the average proportion of boys are usually recruited; and this explanation is corroborated by the fact of a gradually increasing proportion of boys in each succeeding year, until 1865, when it reached its highest point—the army being disbanded in 1864. From this period we have a gradually declining proportion of males for the next three years, owing perhaps to the larger number of marriages (from money being plentiful), and for this reason giving a larger proportion of first children, among which the proportion of boys is less than in the closely succeeding pregnancies. In the next three years, money being less plentiful, marriages decreased, and the proportion of male births increased.

For the entire period of eleven years, the proportion of boys to girls born to white parents was as 110.65 to 100, while among the colored population only 101.14 males were born to 100 females. The proportion of boys born in the city of Philadelphia, in the period comprehended in these calculations, is much larger than that of any other city or entire State from which I have been able to get returns, New York city having (1853 to 1871) only 107.8, notwithstanding her much larger foreign population, amounting to nearly 100 per cent. more than Philadelphia.

Cities as a rule (deduced from statistics in Europe), have a smaller proportion of boys than villages and the neighboring country, and I imagine Pennsylvania would show a larger proportion of males in her births than her largest city—but this law of nature does not always hold in the United States, because of excess of foreign element in cities over country districts, and other circumstances connected with movement of population westward.

As an example of this exception, I may cite Providence, R. I., which had (1854 to 1872) from 95.2 to 113.8, or an average of 105.9 boys to 100 girls, while the entire State, in the same period, had from 100.3 to 112.9, or an average of 105.5 boys to 100 girls.

The proportion of boys to girls in the conceptions by seasons follows the usual law, being sensibly greater in spring, particularly the month of April, corresponding with the largest number of conceptions. The greater number of marriages in the autumn and winter increases the proportion of conceptions in these seasons, but with from 137 to 233 marriages in excess of the number in the spring, the last named season has within two as large a number of conceptions.

The proportion of males, in the general population of the city, had sensibly diminished during the period comprehended between 1830 and 1860, it having decreased .61 per cent. From 1860 to 1872, 113.44 males¹ died to every 100 females, while only 110.5 boys were born to 100 girls. The proportion of males to females, in the population in 1860, was 90.93 to 100, and had the influx from neighboring places been in the same proportion, by virtue of the excess of male deaths over male births, there would have been 90.37 males² to 100 females in the population of 1872; and if the city had relied wholly upon its resident population for its increase, the proportion of females would have been still greater.

I have seen statistical tables which seemed to indicate that females decrease their mean average duration of life more than males, by taking up their residence in the country, while men decrease their years more than women by a residence in cities.³ Thus, in Michigan, in 1870, the males, at death, were 1.16 years older than the females, while in Rhode Island and in the city of Philadelphia, the females were more than two years older than the males at the time of death; and for the same places the colored female decedents were from ten to above thirteen years older than the males. This excessive mortality among the male blacks over

¹ From the author's paper on the "Relative Viability of the Sexes," etc., *N. Y. Medical Record*, June 15 and July 15, 1873.

² This estimate was made before the census report was published, and is singularly in harmony with the latter, as the proportion of males to females in 1870 was 90.50 to 100 (census).

³ This point was maintained and proved in the author's paper on "Relative Viability," etc., etc., above referred to.

females, when coupled with the larger proportion of females in the births, fully accounts for the great excess of colored females in the population, and is at variance with the opinion of Dr. Emerson, who suggested, as a cause of this excess, the greater demand for female servants.

I stated, in my preliminary remarks, that advances in civilization bring with them, among other things, a decline in the proportion of boys in the births; and in looking at the proportion (108.11), in the period from 1820 to 1831, and comparing it with the proportion (110.65), for the decade from 1860 to 1871, it would appear as if Philadelphia had retrograded instead of having advanced; but we must look to the increased proportion of foreigners giving birth during the latter period in explanation of this fact. When each decade is halved, we find the rule holds, as it does throughout Europe. In the decade from 1820 to 1831 there was a decline in the last five years over the first five of 1.38 per cent., and in the second part of the decade, from 1860 to 1871, the decline was .22 per cent., and would undoubtedly have been greater had it not been for the influence of circumstances connected with the rebellion.

It is a law, that the greater the fecundity the greater the proportion of male births; but this rule is subject to exceptions, from changed circumstances, altered physical conditions of the parents, the proportion of foreigners among parents, and the proportion of races in the population of the city, from which statistics are elaborated. We have seen that the colored population of Philadelphia gave only 101.14 males to 100 females, while the whites gave 110.65; and if we could have separated the Jewish births, I have no doubt we should have found the proportion from 125 to 150 boys to 100 girls, if not even more, as we know in every instance in which comparisons have been made between Israelites and Christians, the Hebrew males were from 114 to 144 to the 100 females, while the Christians were always less than 109, usually less than 106 in countries having a fixed population.

From 1860 to 1872 there were on an average 71.7 Jewish marriages annually, and if a larger proportion of Hebrews do not marry than other religionists in the city, the population of the city must comprehend $(71.7 \times 101) = 7,241$ Hebrews; but if they marry less frequently, or have a larger number of persons in the

population to each marriage, (as was shown in an article¹ by the writer devoted to the biostatic peculiarities of this race), there are certainly more than I have estimated above, probably (71.7x130), or from nine to ten thousand; hence there is one Israelite to every eighty inhabitants. From 1861 to 1873 (12 years), there were in each year respectively, 32, 64, 70, 82, 77, 126, 67, 59, 69, 66, 76, 83 Hebrew marriages, or an average of 75 for the first six years and 70 for the last six years. The effect of the rebellion (which began in 1861 and ended in 1865) is singularly noticeable in its influence on the proportion of marriages, as there were but thirty-two in the year (1861) in which the war began, owing to the depression of business, and nearly four times (126) as many in 1866 (the year following the close), owing to the fortunes made during the conflict.

This is corroborative of the opinion expressed by the writer in his article on "The Biostatic Peculiarities of the Jewish Race," viz.: That they were more careful to make provisions for the event than Christians.

The influence of the accession of a larger percentage of the foreign element in the population, in altering the proportion of males in the births, is evident from the examination of the following statements, which I have elaborated from the Registration Report of Michigan for 1870, viz.: That while foreign fathers have only 104.18 boys to 100 girls, foreign mothers have 111.17 to 100; and where both parents are native, they have 107.77 boys to 100 girls, while if both are foreign, they have 109.31 to 100. This same rule obtains to a still greater degree in case of twins and illegitimate births, while it is reversed in case of still-births.¹ Fuller particulars and cause of this peculiarity will receive attention in a special article.² This report, so skilfully compiled by Dr. H. B. Baker, is the only one I have yet seen in which the nativity of the parents and sex of the offspring were both stated in such a manner as to admit of the calculations above given.

The increase in the proportion of parents giving birth in the

¹"Longevity and other Biostatic Peculiarities of the Jewish Race," *New York Medical Record*, May, 15, 1873, pp. 241-2-3-4; copied in the *Cincinnati Lancet and Observer* July, 1873, pp. 417-429; also *Hebrew Leader*, N. Y., May 23-30, June 6-13, 1873.

²The effect of Nationality of Parents on Fecundity and the Proportion of Sexes in Births.

city, who were themselves born in other towns, or in the country, is not without influence in increasing the proportion of male births.

With these facts before us, then, it is not difficult to understand, why we had a larger proportion of boys born in the last decade, than in the decade forty years before.

INFANT MORTALITY.

Of all the persons dying in Philadelphia for the twelve years ending December 31st, 1872, 28.5 per cent. were one year and under,¹ 8.5 per cent. from one to two years, and 8.3 per cent. from two to five years of age; or 45.3 per cent. were under five years of age. From 1807 to 1827 (20 years), 39.8 per cent. of the total mortality was from children under five years of age. From 1858 to 1870, it was 45.54 per cent.

There does not appear to be any decline in infant mortality in this country, but rather an increase, while Dr. Farr reports a decline of one-half in the last hundred years—from 74.5 per cent. (1730–1749), to 29.8 per cent. (1851–1870).

To every 10,000 deaths of males under one year of age, in England, France, Belgium, Prussia, Sweden and Saxony, only 8,060 deaths of females occurred, or 124 males to every 100 females. This fact is rendered still more striking when we state that the proportion of males to females in births, in those countries, does not exceed 107 males to 100 females, while the proportion of sexes in the population under one year is necessarily much less than this last even.²

¹ The comparison of the mortality of children under five years in other cities and States is as follows:

New York, 1804 to 1853, 48.79 per cent. 1866 to 1870, 50.45 per cent. Chicago, 1843–1869, 51.24 per cent.; Boston, 1811–1839, 37.87 per cent. 1868–1872, 42.22 per cent.; Providence, 1856–1870, 38.45 per cent.; 1839–1870, 39.78 per cent.; St. Louis, 1871, 51.10 per cent.; Baltimore, 1850, 1860, 1862, 1865, 1866 and 1869, 45.54 per cent.; Cincinnati, 1868, 46.68 per cent.; Washington, 1849, 1852, and 1868, 46.54 per cent.; United States (census), 1850, 38.40 per cent.; 1860, 42.89 per cent.; 1870, 41.28 per cent.—*Dr. Towner, Free Sanitariums, Washington, 1873. Pp 72–5; also Fact of Vital Statistics, etc., 1872.*

² Dr. Tripe, "On the Relative Mortality of Males and Females under five years of age. *Br. and For. Med. Chir. Review*, Apr. 1857, p. 455–70.

ILLEGITIMACY.

The estimated number of illegitimate births appears to be low, but the percentage¹ (4.1) is as high as that given by Mr. Acton for London. The proportion of the sexes in these births is only known in the reports from the almshouse, where it follows the nearly *universal* rule in having a smaller proportion of males than legitimate births, as may be seen in the foot note.

The larger proportion of females in such births has been so frequently recorded as to be a fixed fact, while the discussion in regard to the cause is still an open question, though the weight of opinion is in favor of the youth of the mother, large proportion of first pregnancies,² and the presence of a condition incident to a certain physiological phenomenon.

The proportion of illegitimate births to the births in general is thought by those who have given the subject much attention to be due to the greater or less excess of women in the population. The law being, the greater the excess of women over men in the population, the greater the proportion of illegitimate births.

INFANTICIDE.

Dr. John S. Parry, from a careful examination of the records in the office of the coroner, finds that the "deaths of infants under one week old in which inquests were held," during the periods from November 1st, 1863, to October 31st, 1866, and from November 1st, 1869, to March 31st, 1870, numbered 372 (241 males, and 131 females, in proportion of 181 males to 100 females). Nearly 100 of these are thought to be cases of infanticide.—*Op. Cit. pp.* 10, 11, 12, 13.

MULTIPLE BIRTHS.

We have no record of the proportion of sexes in multiple births, but I feel warranted, from my researches in this direction, in enunciating a law which seems to hold in all the cases to which I have applied it, viz.: the greater the number of products at a single labor, the smaller the proportion of males, when compared with

¹The following percentages may be compared with Philadelphia, viz.: London, 4.1; Italy, 5.1; Spain, 5.5; England, 5.9; France, 7; Prussia, 7.5; Scotland, 9.5; Edinburgh, 10.1; Austria, 10.9; Bavaria, 22.5; Paris, 28.1; Vienna, 51.5.

² See further in author's paper on the "Physical Aspects of Primogeniture," *New York Medical Record*, Nov. 15, 1873.

births occurring under similar circumstances, and in the same locality.

STILL-BIRTHS.

The proportion of boys to girls in still births was only 134.4, which is lower than the proportion for the State of Rhode Island for the past 19 years, where it was 148.9 to 100, while in Massachusetts, from 1852 to 1869, the proportion was 146.6, and in Michigan, 1869, it was 145.8, and in 1870, 162.5. The larger proportion of males in still-births in States over cities, as would appear from these figures, is probably due to less skillful accouchers or difficulty in reaching the case at the proper time, and possibly from larger size of child's head in the country than in the city. The greatly increased proportion of still-births in the almshouse over the city in general may be due to the fact that a larger percentage of them are first children, or from the enfeebled or diseased condition of the mothers.

The greater proportion of males in still-births is due in a measure to the more frequent defective development of males than of females, as I have shown in my paper on the "Relative Viability of the Sexes, etc." This view is corroborated by the excessive mortality of males in the first years of life, even to the tenth. Reasoning from this stand-point, I cannot help stating my conviction in regard to the cause of a larger proportion of males (146.6) in still-births in the State of Massachusetts for the eighteen years mentioned, as being due to defective development, which I believe is clearly chargeable to the incapacity of the mothers. Wherever the proportion of males is high in still-births among parents of the *same nationality*, who are treated by equally skillful accoucheurs, I am persuaded it is usually a reflection on the mothers. Massachusetts, with 146.6 males to 100 females still-born, had but 105.8 males to 100 females in general births, while Philadelphia, with 110.65 males to 100 females in births in general, had but 134.4 males to 100 females still-born. Consequently Massachusetts mothers do not compare favorably in this particular with Philadelphia mothers. I have pointed out in another place¹ that when the parents are of different nationalities the proportion of still-born males was increased to 200 males to 100 females, when

¹"Effect of Nationality of Parents on Fecundity and Proportion of Sexes in Births."

the father was foreign and mother native, while it was but 150 males to 100 females in native father and foreign mother. Both parents foreign, 320 males to 100 females; both parents native 127 males to 100 females.

Notwithstanding an increase in the proportion of marriages to the population (owing to excess of money at the disbanding of the army, and subsequently), during the last half decade, the proportion of births to each marriage was diminished 6.71 per cent. from the first half.

In 1861 there were 3.91 births to each marriage annually, while in 1870 there were only 2.67, or an average of 2.61 for the entire decade. In the decade from 1820 to 1831, it required but 22.6 inhabitants to recruit one birth each year, while in the decade from 1860 to 1871, it required 37.3, or 39.4 per cent. more.

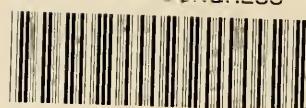
The most important of all the deductions from these figures is the mean average duration of human life, which it will be seen has gradually diminished for each period; and all these are above the actual duration of life, from the fact that the greater part of those 9,000 persons who annually take up their residence in the city are adults, and have passed the most critical period of their lives elsewhere.

The decline in the duration of human life in this city since 1807 is further corroborated by the calculations showing that one person died annually to every 47.86 of the population, in period from 1807 to 1820, while in the next period (1820-1830) there were only 41.1 inhabitants to each decedent, and this number is further reduced to 39.1¹ in the period from 1860 to 1871, being 18.3 per cent. less than in the period from 1807 to 1820.

From the fact that the number of males in the population to each male dying was 33.5, while the number of females in the population to each female dying was 39.4, we are convinced that females have a higher mean average duration of life than males, as was the case in Rhode Island, as was indicated in the foot-notes, and as proved in the author's article² already referred to.

¹New York city, in 1870, had but 33.9 inhabitants to each death, which indicates that the duration of life in that city is shorter than in this.

²The "Relative Viability of the Sexes, particularly with regard to the relative liability to the inheritance of certain transmissible diseases—considered in relation to the selection of Life Insurance Risks, with a view of exhibiting the unjustness of charging higher rates for women, etc, etc."—*N. Y. Medical Record*, June 16 and July 15, 1873. Pp. 297-302 and 353-4-5.



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24 *Statistics Relating to the Births, Death-Rate, etc.*

The deaths have been all recorded, while many of the births escape the attention of the registrar,¹ and yet, notwithstanding this last-named fact, the latter have been in excess of the former every year except one, and that deficit was probably due to some circumstance connected with the rebellion, then just ended.

In the year 1872, however, the deaths exceeded the births (as recorded) by 472, owing to the epidemic of small-pox and excessive infant mortality during the hot summer of that year.

The decline in the increase of the population by births, from 38.9 per cent., in the decade from 1820 to 1831, to 10.8 per cent., in decade from 1860 to 1871, and the total decline from all causes, from 37.8 per cent. in the former period, to 19.2 per cent. in the latter period, is a noticeable feature in the movement of population in our city, and corroborates the statement made in my preliminary remarks, viz.: *population increases in a decreasing ratio.*

¹The deficiency in the return of births is estimated at 20 per cent. by Mr. George E. Chambers, Registrar (Report for 1872, p. 3), which is probably quite enough, for this would give us one birth to every 27 inhabitants, while at present reckoning we have only 1 in 37. From 12 to 15 per cent. would probably be nearer correct.

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